

Operating Instructions Busch-Dimmer®

Universal master dimmer
Master Dimmer 6583-500
Electronic power module
6584-500



Operating Instructions

Busch-Dimmer®

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1 Safety



Warning

Electric voltage!

Risk of death and fire due to electrical voltage of 230 V.

- Work on the 230V supply system may only be performed by authorised electricians!
- Disconnect the mains power supply prior to installation and/or disassembly!

2 Intended use

The device is to be used exclusively with the components that are supplied and licensed as described in chapter "Setup and function".

3 Environment



Consider the protection of the environment!

Used electric and electronic devices must not be disposed of with domestic waste.

- The device contains valuable raw materials which can be recycled. Therefore, dispose of the device at the appropriate collecting depot.

All packaging materials and devices bear the markings and test seals for proper disposal. Always dispose of the packaging material and electric devices and their components via the authorized collecting depots and disposal companies.

The products meet the legal requirements, in particular the laws governing electronic and electrical devices and the REACH ordinance.

(EU Directive 2002/96/EC WEEE and 2002/95/EC RoHS)

(EU REACH ordinance and law for the implementation of the ordinance (EC) No.1907/2006)

4 Operation

4.1 Local operation

The master dimmer can also be operated onsite via exchangeable control elements.

Exchange of the standard cover against rotary dimmer control element, -push-button control element or -timer control element.

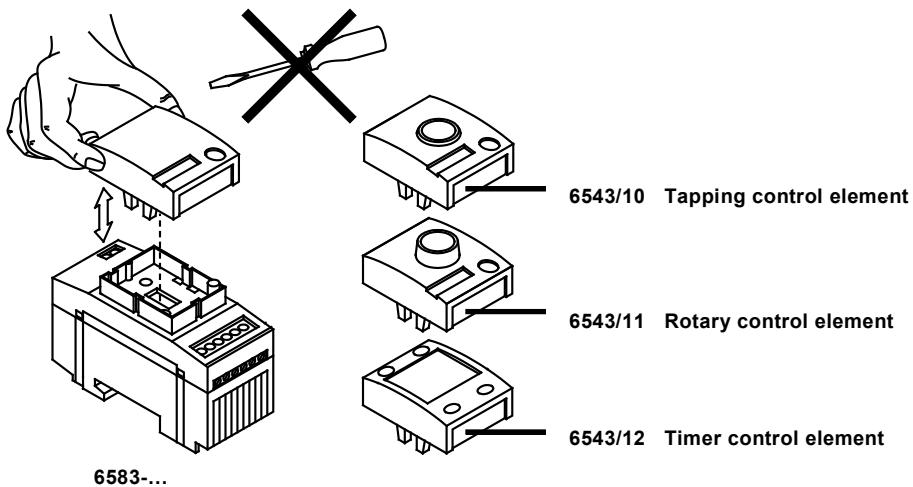


Fig. 1: Replaceable control elements

4.1.1 Operation with push-button control element

Activation

- Tap briefly on the push-button.
The brightness value last set (memory value) will be automatically set.

Switch-on with basic brightness

- Keep the push-button pressed.
The dimmer starts with the basic brightness and dims the light brighter as long as the push-button is pressed.

Dimming

- Keep the push-button pressed.
The dimmer changes the brightness of the connected lighting system. With every stop, the dimming direction is reversed. At maximum brightness, the dimmer stops; at minimum brightness, the dimming direction changes.

Deactivation

- Tap briefly on the push-button.
The current brightness value is saved as a memory value. The dimmer switches off immediately.

4.1.2 Operation with rotary control element

Activation

- Press the rotary button.
The brightness value last set (memory value) will be automatically set.

Turn-on with minimum brightness

- Turn the rotary knob first to the left (approx. 45°) and then press it.

Switch-on with maximum brightness

- Turn the rotary knob first to the right (approx. 45°) and then press it.

Brightness adjustment

- Turn the rotary knob to the right or to the left while the dimmer is switched on.

Deactivation

- With the dimmer being on, press the rotary button.
The dimmer switches off immediately.



Note

The rotary knob does not have a limit stop.

4.1.3 Operation with timer control element

The timer control element 6543/12 is used for automatic timer control. Manual control is only possible via connected extension units or via the two upper buttons of the control element. Information on how to program the timer can be found in the operating instructions for control element 6543/12.

4.2 Programming using the function key

The following functions are activated by actuating the function key (1) for different periods of time.

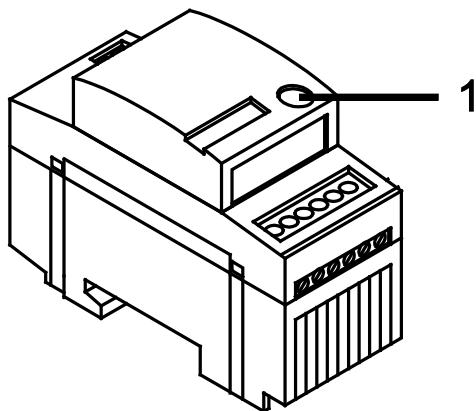


Fig. 2: Master Dimmer

1 Status display / function key

- Green = Ready for operation
- Red = Fault

Programming a brightness value

1. Set the desired brightness value with push-button or the rotary knob.
2. Then press the function key briefly (1).

Deleting the brightness value

1. Switch the dimmer off.
2. Then press the function key briefly (1).

Reset

- Then press the function key (1) for more than 2 seconds.
The dimmer performs a load detection and is then reset to its delivery status.

4.3 Extended operation via control modules

A wide variety of switching and dimming functions can be performed conventionally via the ABB-i-bus® or ABB-Powernet-KNX using the control modules (6597, 6197/... and 6997/60).

Please refer to the relevant operating instructions, as well as to the latest functional descriptions in the technical manuals and to the KNX product database.

5 Technical data

Device-specific	6583	6584
Nominal voltage	230 V AC ± 10 %, 50 / 60 Hz	230 V AC ± 10 %, 50 / 60 Hz
Nominal power (depending on the ambient temperature, a power loss of 5% in case of electronic and 20% for conventional transformers needs to be considered)	500 W / VA	420 W / VA
Nominal power range	60 ... 500 W / VA	200 ... 420 W / VA
Capacity boosting	With a maximum of 6 electronic power modules (1200 ... 2520 W / VA for professional application)	
Total output	A maximum of 3000 W / VA for professional application	
Nominal current	2,17 A	1,83 A
Push-button input	230 V AC ±10 %, 50 / 60 Hz (L or N)	—
Rotary dimmer input	230 V AC ±10 %, 50 / 60 Hz (L)	—

General

Maximum cable length	100 m
Maximum total cable length between the data outputs	A maximum of 30 cm between devices, a maximum total of 2 m
A maximum total cable length between the RJ 12 connectors	
Protection type	IP 20
Module width	2 MW (1 MW = 18 mm)
Total ambient temperature range	0 ...70 °C
Connected load	
- Ambient temperature range	0° ... 45°C connected load 100 %
- Ambient temperature range	45° ... 70 C reduced connected load (Derating)



Note

Use the prefabricated RJ 12 data line to connect the devices. The data line is included in the scope of supply of the electronic power module 6584.

6 Setup and function

The device is intended for the activation of the following types of loads:

230 V	230 V incandescent lamps
230 V	230 V halogen lamps
	Low-voltage halogen lamps with conventional transformers
	Low-voltage halogen lamps with electronic transformers



Caution

Possible damage to the device due to an inadmissible combination of different types of transformers!

- Conventional and electronic transformers must not be dimmed together.

All other load combinations are permissible.

6.1 Features of function and equipment

Universal master dimmer

- For the modular setup of an lighting system
- Phase-angle / phase-section
- Brightness control
- Control via an attachable push-button / rotary / timer control element
- Decentralised control via extension units (conventional push-buttons, e.g. 2020 US, or 2021/6 UK and rotary dimmer extension unit 6592 U) or control modules.
- Illumination of the push-button is only possible with N-conductor terminal
- Reset, programming function
- Light value storage (memory function)
- Status display
- Not suitable for generator networks

Electronic power module

- Capacity boost via cable connected in parallel to the output side (with RJ12 plug) with electronic power module 6584
- In combination with up to 6 electronic power modules (3000 W/VA) possible.

6.2 Protective functions

- Inrush current limitation through soft start
- Electronic overload / excess temperature protection
- Electronic short-circuit protection
- Thermal fuse

6.3 Possible combinations

	 6583	
 2020 US	X	
 2021/6 UK	X	
 6597	X	
 6584	X	
 6543/10	X	
 6543/11	X	
 6543/12	X	
 6997/60	X	
		 6584
		X
	6583	

7 Reduction of the connection load (derating)

The devices heat up during operation because part of the connected load is lost and converted into heat. If the ambient temperature rises above 45°C during operation, the connected load must be reduced in accordance with the diagram.

With a distance of approximately 1 cm between the devices or the installation of a heat distribution fan the ambient temperature can be effectively reduced.

Use the following formula for the calculation of the nominal power:

Nominal power = transformer losses* + lamp power

* 5% of the nominal transformer power in the case of electronic transformers

* 20% of the nominal transformer power in the case of conventional transformers

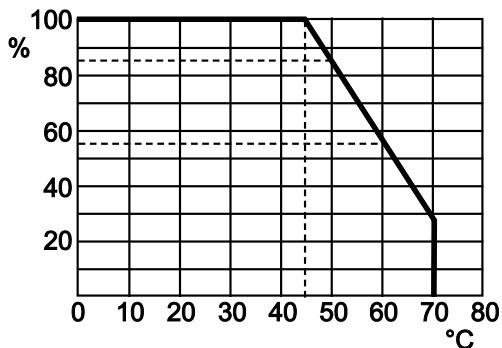


Fig. 3: Derating

Unit	Meaning
%	Percentage value of nominal power
°C	Ambient temperature

8 Installation and electrical connection



Warning

Electric voltage!

Risk of death due to electrical voltage of 230 V during short-circuit in the low-voltage line.

- Low-voltage and 230 V lines must not be installed together in a flush-mounted socket!

8.1 Requirements for the electrician



Warning

Electric voltage!

Install the device only if you have the necessary electrical engineering knowledge and experience.

- Incorrect installation endangers your life and that of the user of the electrical system.
- Incorrect installation can cause serious damage to property, e.g. due to fire.

The minimum necessary expert knowledge and requirements for the installation are as follows:

- Apply the "five safety rules" (DIN VDE 0105, EN 50110):
 1. Disconnect from power;
 2. Secure against being re-connected;
 3. Ensure there is no voltage;
 4. Connect to earth and short-circuit;
 5. Cover or barricade adjacent live parts.
- Use suitable personal protective clothing.
- Use only suitable tools and measuring devices.
- Check the supply network type (TN system, IT system, TT system) to secure the following power supply conditions (classic connection to ground, protective earthing, necessary additional measures, etc.).

8.2 Mounting



Warning

Electric voltage!

Risk of death and fire due to electrical voltage of 230 V.

- Work on the 230V supply system may only be performed by authorised electricians!
- Disconnect the mains power supply prior to installation and/or disassembly!

The MDRC must only be installed on mounting rails according to DIN EN 500022. The MDRC is latched onto the mounting rail.



Warning

Overheating due to excessive loads!

Incorrect installation can cause serious damage, e.g. due to fire.

- Dimmer capacities > 1000 W are licensed only for professional use.
- Ensure that there is adequate cooling.



Warning

Risk of damage due to low connected load!

Operation with isolating transformer networks with a connected load of $\leq 10 \text{ kVA}$ is not admissible.

Incorrect installation can cause serious damage to property, e.g. due to fire.

- Observe the instructions regarding installation and electrical connection.



Caution

Risk of damaging the device due to overheating!

- When using transformers, ensure that each transformer is fused individually on the primary side or with a thermal fuse according to the manufacturer's specifications.
- Use exclusively wound safety isolating transformers according to DIN VDE 61558.



Caution

Risk of damaging the device due to excessive current!

During reactivation of the load excessive currents and voltages can occur, which may lead to the destruction of the device.

- Switching the load via a serial switch contact is not admissible.



Caution

Risk of damaging the device due to excessive voltages!

Operation of an unloaded transformer connected to a dimmer may destroy both the transformer and the dimmer. This is caused by a possible voltage rise which may occur between an unloaded transformer and the dimmer.

- Secondary-side idling of conventional transformers is permitted neither during commissioning nor during operation.
- Operate conventional transformers always at the nominal transformer load (derating).



Note on operating transformers with dimmers

To achieve the same linear rise in the brightness level of halogen lamps over the entire adjusting range from bright to dark, transformers with the same secondary voltage and the same power should be used.

When installing, please bear in mind that transformers, depending on their quality and version, may generate humming noise when used with dimmers.

Use an inrush current limiter if excessive inrush currents occur.

8.3 Electrical connection

Mains and load connection

The mains connection takes place at terminals **L** and **N**. As an option the **is** also connected to one of the terminals **↗** (controlled outputs).

Push-button operation (terminal 1)

Any number of push-buttons (e.g., 2020 US) can be connected in parallel for switching and dimming of a master dimmer 6583 via "terminal 1" push-button input. Sensing is carried out selectively to L or N. The common activation of several dimmers via a push-button or rotary dimmer extension unit 6592 U is not admissible.



Caution

Risk of short-circuit!

- Please note that during push-button operation the phase of the extension unit and the phase of the supply voltage must be the same.



Information for connection

- For all push-button extension units do not connect the lighting glow lamp with parallel contacts. Instead, use a push-button with an N-connection.
- When laying lines, ensure that there is sufficient distance between the control lines and load lines (at least 5 cm).

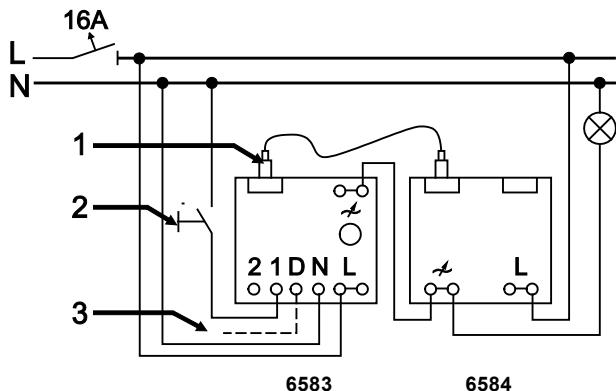


Fig. 4: Capacity booster of master dimmer 6583 with electronic power module 6584, push-button operation

1 Data line RJ12 (25 cm)

2 Extension unit, e.g. 2020 US (NO contact push-button)

3 Control modules 6597, 6997/60, 6197/11- ...

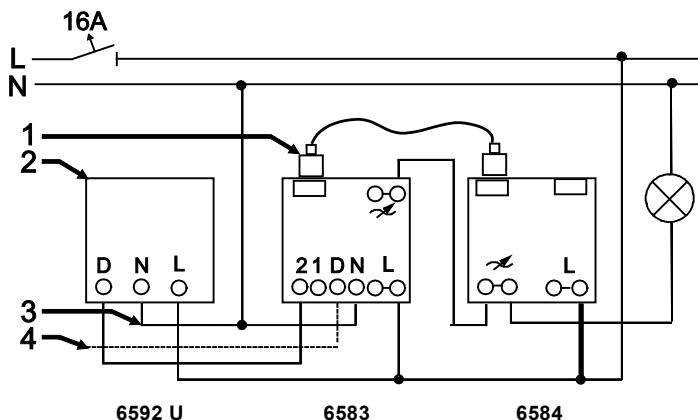


Note

For the joint dimming and switching of several master dimmers 6583 and for polyphase operation / individual or central controls, use control module 6597 / 6197/11- ... or 6997/60.

Rotary dimmer operation (terminal 2)

For dimming via the dimmer input (terminal 2), up to 5 rotary dimmer extension units 6592 U can be connected.



Power booster of master dimmer 6583 with electronic power module 6584, dimmer operation

- 1 Data line RJ12 (25 cm)
- 2 Dimmer extension unit (maximum of 5 extension units on the one dimmer)
- 3 Optional connection of neutral conductor on 6592 U
- 4 Control modules 6597, 6997/60, 6197/11- ...



Note on the connection of control modules

If a control module is connected, the on-site operation and the extension units are automatically locked.

Data line (terminal D)

To switch and dim via the data line at terminal D, the dimmer can be operated via control modules. The following combinations for control via ABB-i-bus®-KNX or ABB-Powernet-KNX are possible:

Control through	Article number
Conventional	Control module 6597
ABB-i-bus®-KNX	Control module 6197/11- ...
ABB-Powernet-KNX	Control module 6997/60



Note

Wiring diagrams can be found in the operating manuals of the devices.

- Keep the data line as short as possible.

Capacity boosting

For synchronous switching and dimming of one lighting system with a connected load of more than 500 VA, a capacity booster is used.

1. Connect dimmer 6583 and electronic power module 6584 via the RJ12 data line; see Fig. 4 and **Fehler! Verweisquelle konnte nicht gefunden werden..**
The RJ12 data line is supplied together with the electronic power module.
2. Connect the outputs \nearrow of master dimmer 6583 to those of electronic power module 6584.
3. Always connect the load line to the last electronic power module.

9 Commissioning

Universal master dimmer

After connecting the supply voltage, the microprocessor integrated in the dimmer evaluates the characteristics of the connected service load and decides whether phase-angle or phase-section control is to be employed. During this calibration process, the lighting system switches on for up to 2 seconds and the device is blocked.



Caution

Risk of malfunction due to inadmissible connection of loads!

To guarantee precise load detection by the dimmer, it must not be operated with a short circuit or with secondarily idling, conventional transformers when the mains voltage is switched on.

After the load has been determined, the colour of the status display changes to green.

10 Fault rectification

Diagnosis	Possible cause	Fault rectification
Light is permanently set to maximum brightness	Basic brightness is set too high	Reduce basic brightness
	Glow lamp is inserted in push-button extension with parallel contacts	Remove illumination from pushbutton extension
	–	Perform a reset
Light cannot be switched on, status display is "off"	Fuse defective	Reconnect/replace line-side fuse
	In correct connection of supply lines / wiring	Check and, if necessary, connect supply lines / wiring correctly
	Dimmer / electronic power module are defective	Replace defective dimmer / electronic power module
Light cannot be switched on, status display "green"	Lamp is defective	Replace lamp
	Transformer is defective	Check transformer and replace if necessary
Light cannot be switched on, status display "red"	Short-circuit	Remedy short-circuit of the load
Light automatically reduces brightness or switches off, status display "red"	Overload	Reduce load in case of overload
	Overheating	Improve heat dissipation by distributed ventilation
		Increase distance between devices
Light flickers	Load is too low	Observe the minimum load
	Fluctuation in mains voltage	Check fluctuation in mains voltage
ELA system hums	Input network interference suppression defective	Check booster
Stereo system / audio station system hums	Distance between the dimmer line and a parallel amplifier line too short.	Increase distance to at least 10 cm



Note

After rectifying the fault and, if necessary, cooling of the device (approx. 30 minutes), press the function key briefly.

- The status display changes from red to green.
- The dimmer is ready.

Operating Instructions

Busch-Dimmer®

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